REMARKS

I. Introduction

In response to the Office Action dated March 31, 2010, Applicants have amended claims 1 and 18 in order to further clarify the subject matter of the present disclosure. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-3 And 8-18 Under 35 U.S.C. § 103

Claims 1, 3, 8-10, 13, 14, 17 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al. (US 2002/0037450) in view of Delnick (USP No. 5,948,464), Xue (USP No. 5,928,812) and Kizu (US 2003/0165739); claim 2 as being unpatentable over Suzuki, Delnick, Xue and Kizu as evidenced by the melting point of acrylonitrile retrieved from http://scientificpolymer.com/catalog/description.sap?QProductCode=134> on 3/27/2010; claim 11 as being unpatentable over Suzuki in view of Delnick, Xue and Kizu and further in view of Ota et al. (USP No. 6,365,300); claim 12 as being unpatentable over Suzuki in view of Delnick, Xue and Kizu and further in view of Hampden-Smith et al. (US 2002/0168570); and claims 15-16 as being unpatentable over Suzuki in view of Delnick, Xue and Kizu and further in view of Daroux et al. (USP No. 6,562,511). Applicants respectfully submit that Suzuki, Delnick, Xue, Kizu, scientificpolymer, Ota, Hampden-Smith and Daroux fail to render the pending claims obvious for at least the following reasons.

With regard to the present disclosure, amended independent claim 1 recites, in part, a lithium ion secondary battery having a porous film comprising an inorganic filler and a first

binder. A content of the first binder in said porous film is 1.5 to 8 parts by weight per 100 parts by weight of said filler. The first binder comprises core-shell type particles of acrylonitrile-acrylate copolymer as a first rubber, and the first rubber is water-insoluble and having a decomposition temperature of 250°C or higher. In addition, the battery contains a negative electrode comprising a negative electrode active material capable of absorbing and desorbing lithium ion and a second binder. The second binder includes a second rubber particle including a styrene unit and a butadiene unit and a water-soluble polymer including a methylcellulose unit. The content of the second binder in the negative electrode is 1.5 to 3 parts by weight per 100 parts by weight of the negative electrode active material.

One feature of the present disclosure is that the porous film of the lithium ion secondary battery comprises an inorganic filler and a first binder having core-shell type particles of acrylonitrile-acrylate copolymer as a first rubber.

It is admitted that Suzuki and Delnick fail to disclose a porous film having a first binder having core-shell type particles of acrylonitrile-acrylate copolymer as a first rubber. Moreover, Xue fails to remedy this deficiency. As mentioned in the Office Action on page 4, Xue teaches a polyacrylonitrile binder for use in a separator. However, Xue is silent with respect to an acrylonitrile-acrylate copolymer as a first rubber. Moreover, Kizu, Ota, Hampden-Smith and Daroux do not, and are not relied upon to remedy this deficiency. As such, the cited prior art fails to teach or disclose all of the limitations of amended independent claim 1 of the present disclosure.

Moreover, the combination of Suzuki and Delnick is improper. Delnick teaches a separator binder made of PVC, PVDF or EPDM. Suzuki teaches the use of core-shell type particles to decrease the proportion of the binder in the positive electrode to hold the active

material and conductive agent without covering their surfaces, thereby increasing the density of the positive electrode material. Further, Suzuki teaches maintaining high conductivity without the need to use a large amount of conductive agent, thereby providing a high capacity (see, paragraphs [0025]-[0026] of Suzuki). However, these criteria are not applicable to binders for separators because inorganic particles in the separator are used for an entirely different function as that of the active material. As such, one skilled in the art would not be motivated to replace the separator binder disclosed in Delnick with the positive electrode binder of Suzuki.

Further, Suzuki states, in paragraphs [0006] to [0008] that "when PVDF is used as a binder for a positive electrode active material, a large amount of PVDF is necessary. In this case, the large amount of the binder covers the positive electrode active material, so the addition of a large amount of conductive material is necessary to obtain good cycle life. The addition of a large amount of conductive material results in a decrease in battery capacity." To solve this problem, Suzuki uses core-shell particles (rubber particles) as the positive electrode binder.

However, in Delnick, a separator containing a binder such as a polyvinylidene fluoride-hexafluoropropylene copolymer and inorganic particles is formed on an electrode surface in order to obtain a thin separator. The inorganic particles contained in the separator are not required to provide conductivity. Thus, there is no reason to consider the ratio of the binder covering the surface of the inorganic particles contained in the separator. Delnick is also silent concerning the ratio of the binder covering the inorganic particles. Therefore, one skilled in the art would not be motivated to use the core-shell particles used as the positive electrode binder of Suzuki as the separator binder of Delnick.

Moreover, Hampden-Smith, scientificpolymer, Ota, and Daroux do not, and are not relied upon to remedy these deficiencies.

Therefore, as is well known, in order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. As Suzuki, Delnick, Xue, Kizu, scientificpolymer, Ota, Hampden-Smith and Daroux do not disclose lithium ion secondary battery comprising: a porous film which comprises an inorganic filler and a first binder, a content of the first binder in the porous film being 1.5 to 8 parts by weight per 100 parts by weight of the filler, core-shell type particles of acrylonitrile-acrylate copolymer as first binder comprises core-shell type particles of acrylonitrile-acrylate copolymer as a first rubber, the first rubber being water-insoluble and having a decomposition temperature of 250°C or higher, the negative electrode comprises a negative electrode active material capable of absorbing and desorbing lithium ion and a second binder, the second binder includes a second rubber particle including a styrene unit and a butadiene unit and a water-soluble polymer including a methylcellulose unit, and a content of the second binder in the negative electrode is 1.5 to 3 parts by weight per 100 parts by weight of the negative electrode active material, it is apparent that Suzuki, Delnick, Xue, Kizu, scientificpolymer, Ota, Hampden-Smith and Daroux fail to render amended claim 1 or any dependent claims thereon obvious. Accordingly, the Applicants respectfully request that the § 103 rejection be withdrawn.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as amended claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

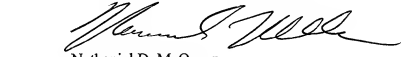
IV. Conclusion

Having responded to all open issues set forth in the Office Action, it is respectfully submitted that all claims are in condition for allowance.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



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